Elevated Printing: Application Use cases

océ
A CANON COMPANY

ICC Display & 3D Print Meeting – Taipei 2016 – 06 May

Michael Dupre

Elevated Printing: Agenda

- Océ-Technologies B.V.
- Brief overview technical background
- Project EIGER: Elevated Printing
- Applications
  - Decoration
  - 3D fine art
  - Other
- Take away

Elevated Printing: Océ-Technologies B.V.

Océ ColorWave 910

- Wide Format CAD/GIS
- Full color, 1600dpi
- Page wide inkjet
- 70.000 nozzles
- Water based up to18 m/min

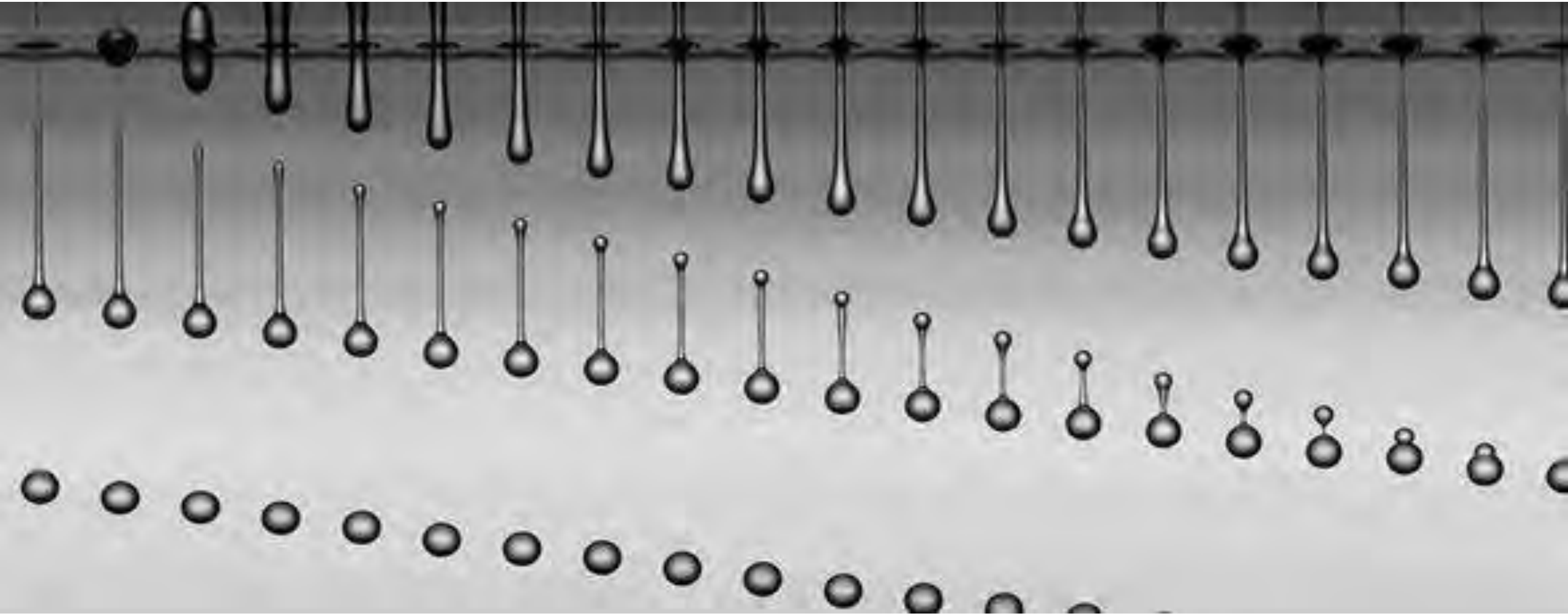
Océ VarioPrint i300

- B3 sheet fed production
- Page wide inkjet
- pigmented water based ink
- Up to 400.000 images / day

Océ Arizona Series

- Sign, display, industrial
- UV curable inkjet
- 7 – 150 sqm/hour

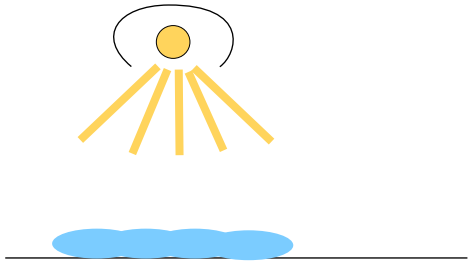
Elevated Printing: Inkjet



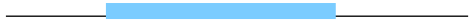
Source: Nature, Vol. 507, March 2014: Photo of the Year 2014; Photo by group prof. D. Lohse, University of Twente.

Elevated Printing: UV curable technology

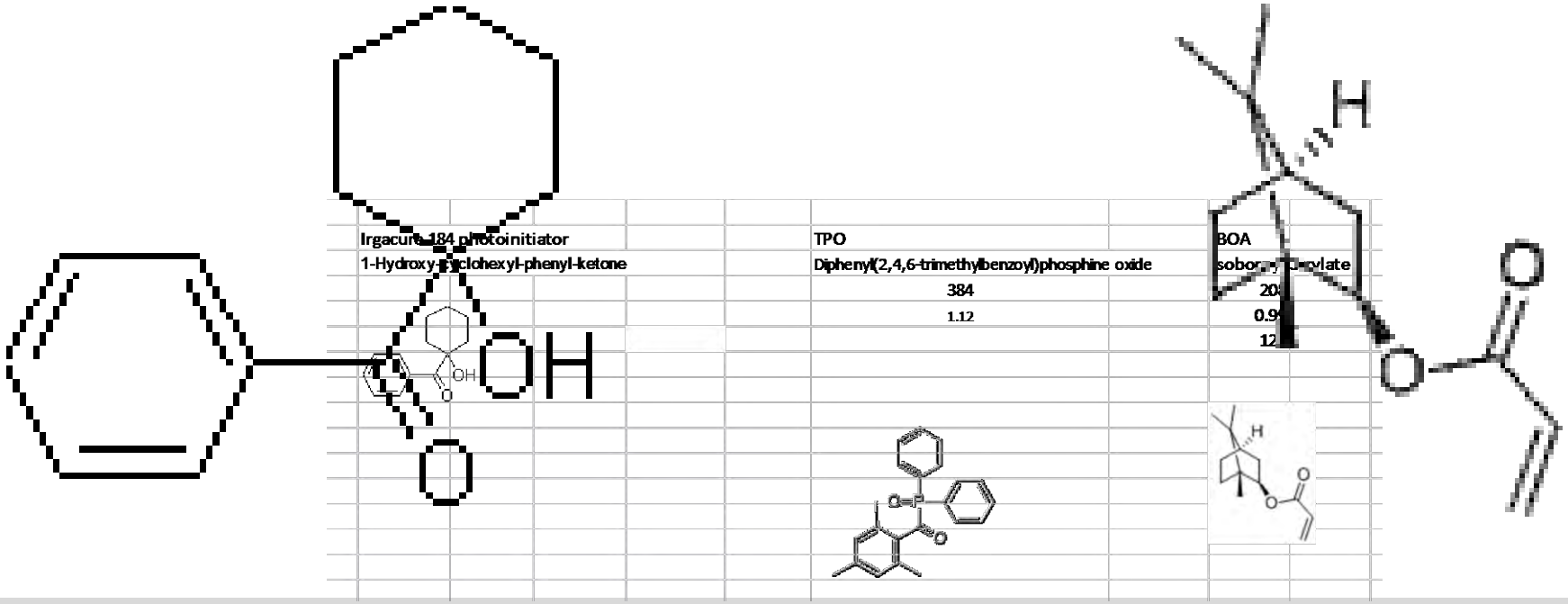
Jetting fluid UV ink



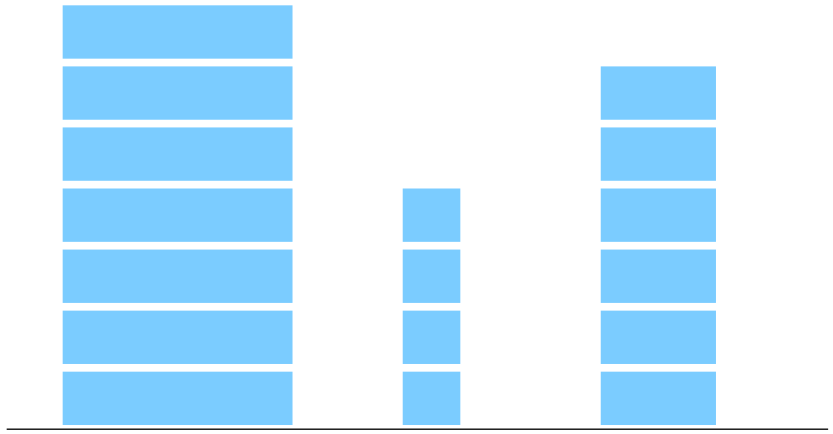
UV light: starts chemical reaction



Thin solid robust ink layer



Elevated Printing: Stacking layers of ink



Elevated Printing

- Stacking layers on top of each other
- curing between each layer

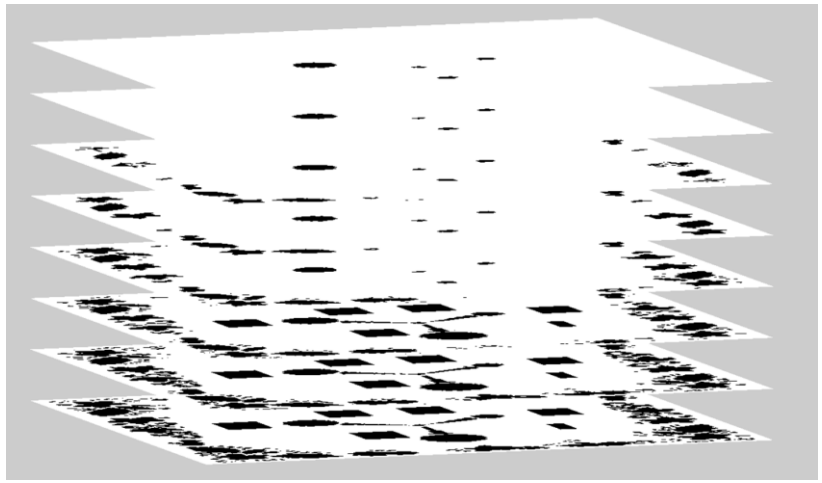
Some challenges

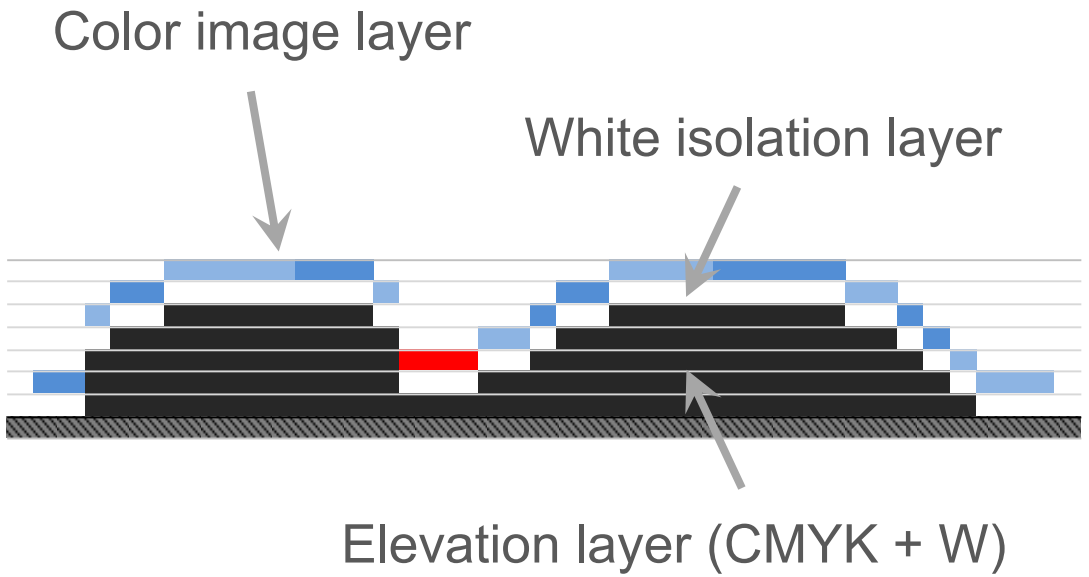
- color
- print head - substrate distance
- adhesion
- counting of layers

Elevated Printing: Stacking layers of ink

slice n
……
……
……
……

slice 2
slice 1

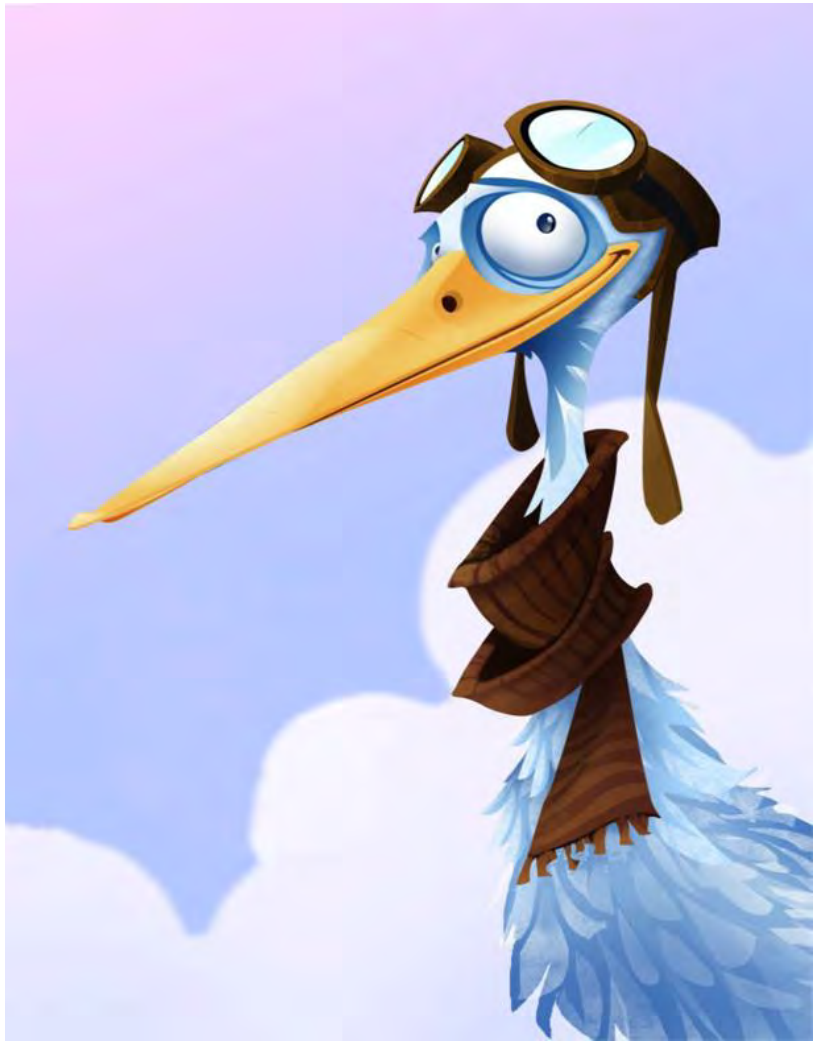




- **Proprietary image processor generates:**
  - Elevation layer (CMYK+W = black)
  - White isolation layer (to cover black)
  - Color layer (= image)

- **Automated printing of all layers:**
  - Optimal alignment color and elevation
  - Automatic height adjustment
  - Device-specific output ICC profile (+ proprietary gloss & reflectance model)

Elevated Printing: Design



- Color-managed Image (RGB or CMYK)
- Height image (Grayscale)
- 2D design tools (plug in for Adobe Illustrator and Adobe Photoshop)

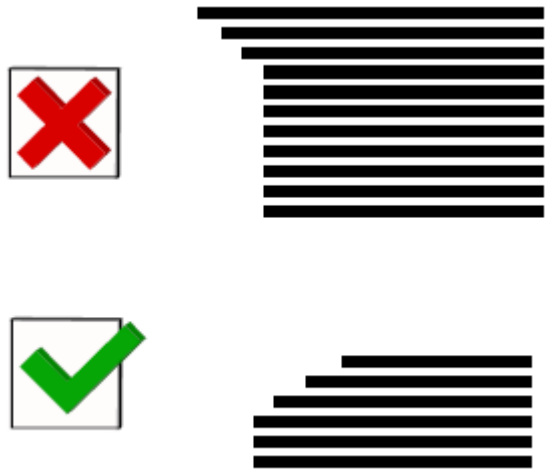
- 3D design tools

Elevated Printing: How Elevated Printing relates to 3D printing

3D print

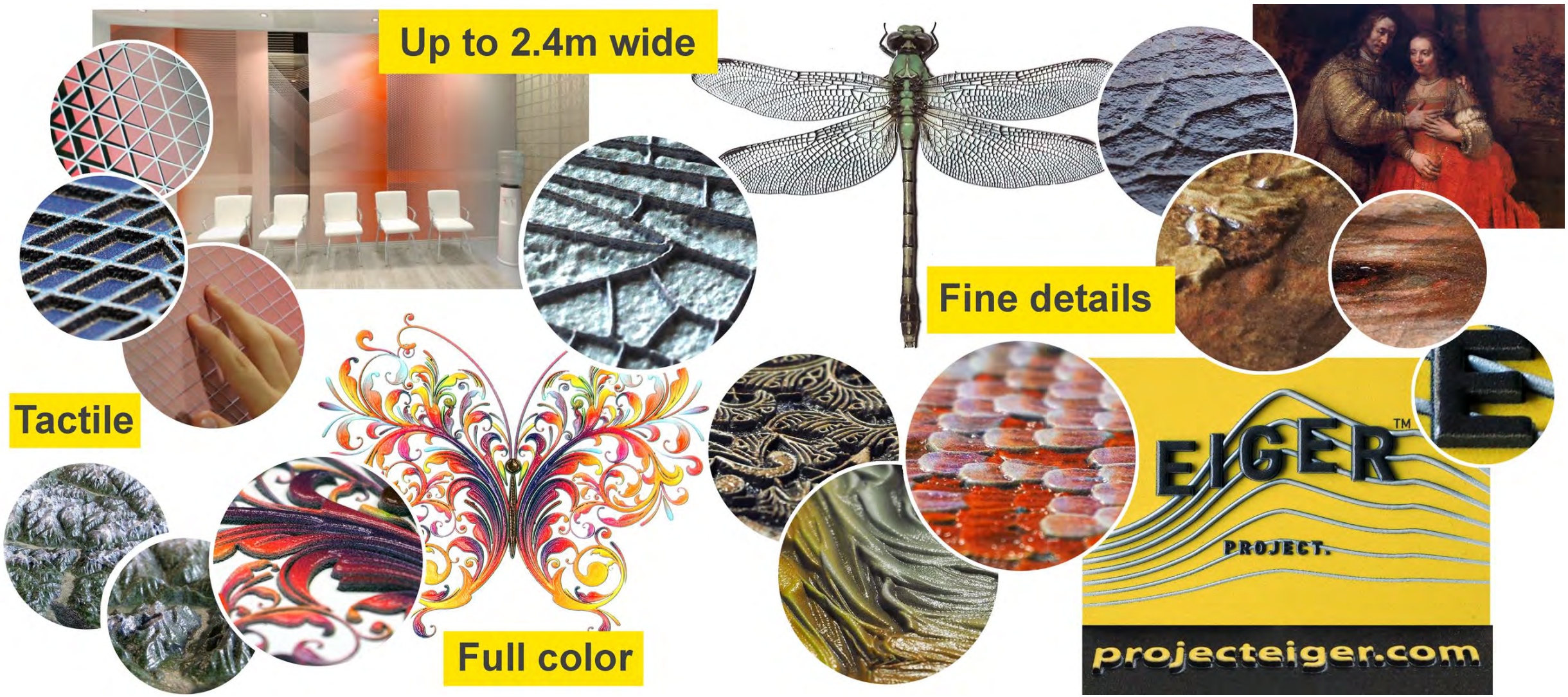
- Limited use of color, less sharp
- Material is low in resolution

Elevated Print



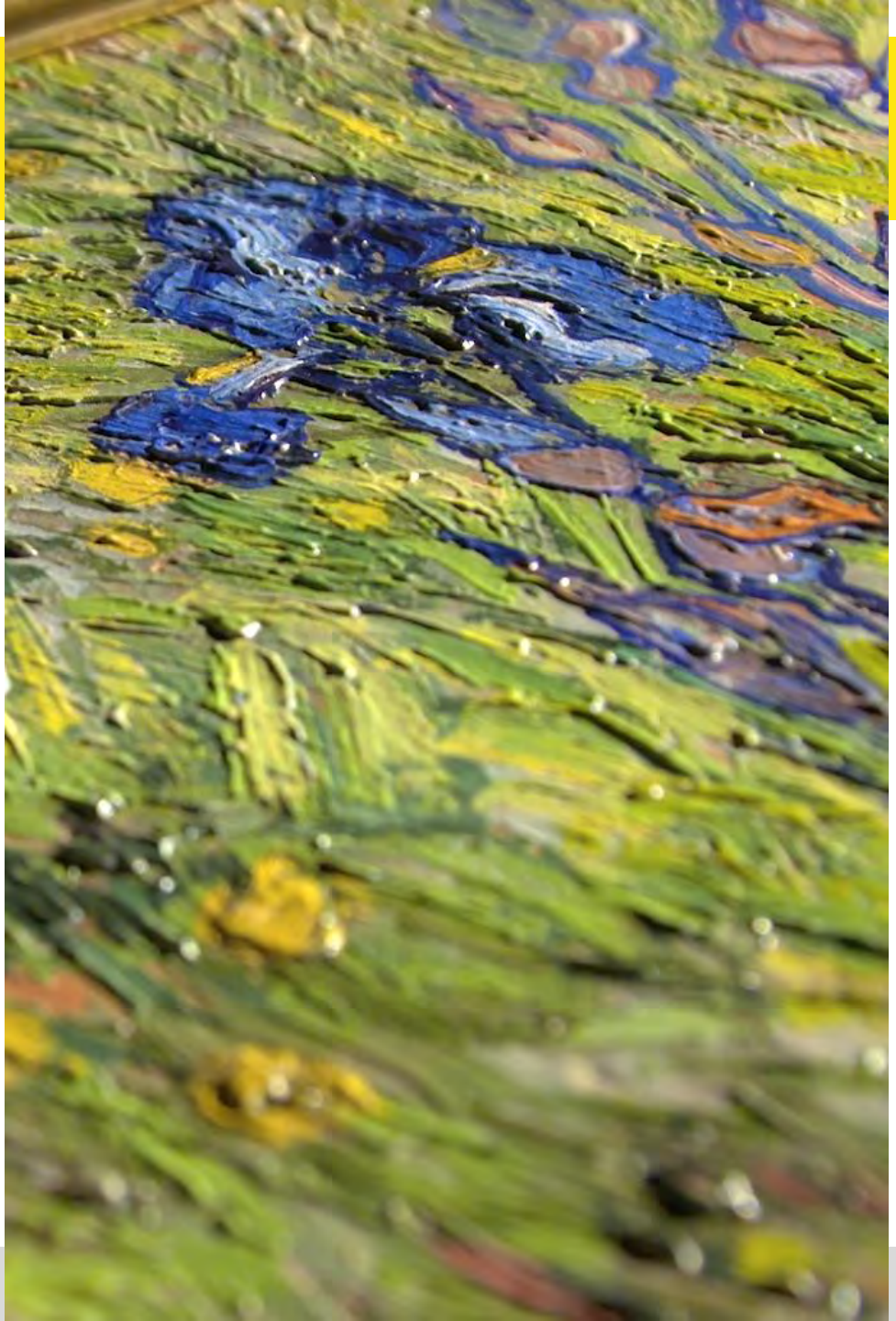
+ very high resolution
+ full color print
+ up to 250 x 122cm
+ 0.005 up to 5mm relief

Elevated Printing: A few applications



Elevated Printing: Project EIGER

- Project EIGER offers a print service to customers, designers, businesses
  - Customer buys prints, not the printer
- Applications are developed together with partners and customers
  - VerusArt: Arius-Technologies, Larson-Juhl (Fine Art re-creations)
  - Super-Maker project together with Design Academy Eindhoven (interior applications)
  - Elevated Maps
  - Delft University of Technology (several projects)
  - Dedicon (materials for visually impaired people)
  - Phone cases
  - Business cards
  - …



Applications: Visually impaired people

- Relief
- Braille
- Full color
- End product
- Mold for vacuum forming

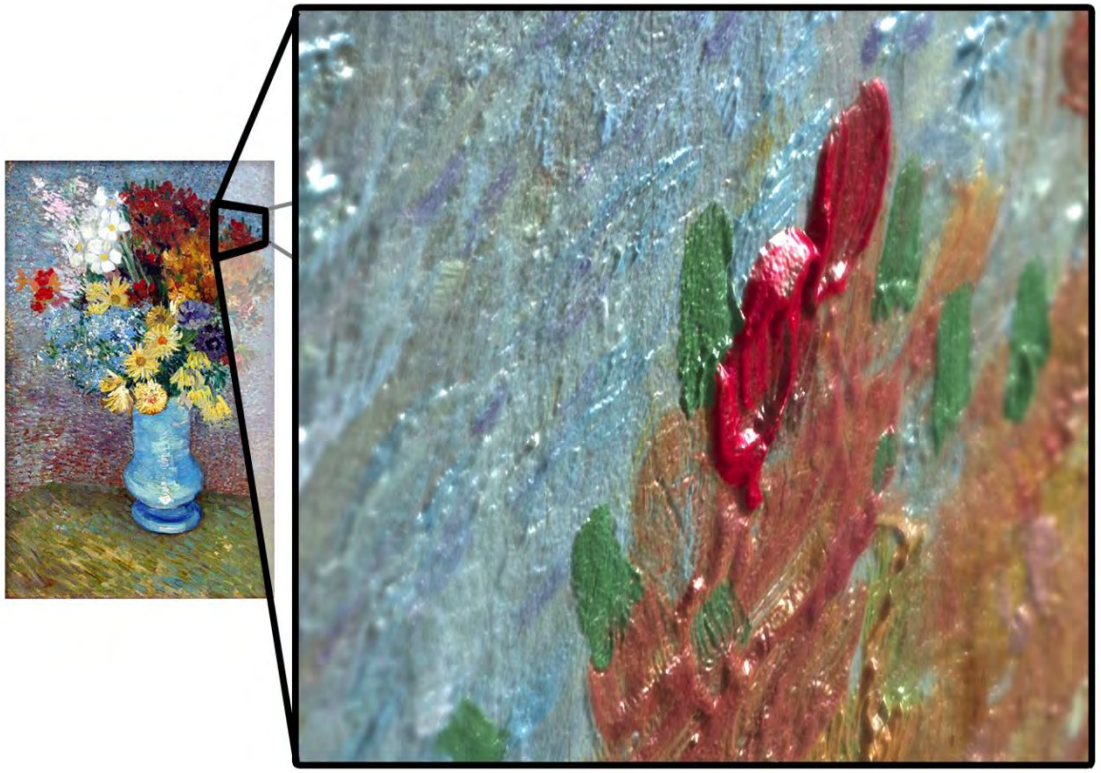
Applications: Gadgets (ink only)

Applications: Elevated Maps

Elevatedmaps

http://www.elevatedmaps.com/

Applications: 3D fine art re-creations



Appearance

Painting	**2D reproduction**
Color	Color ✓
Details	Details ✓
Relief (brushstrokes)	Relief (brushstrokes) ✗
Gloss variation	Gloss variation ✗
.....	.....

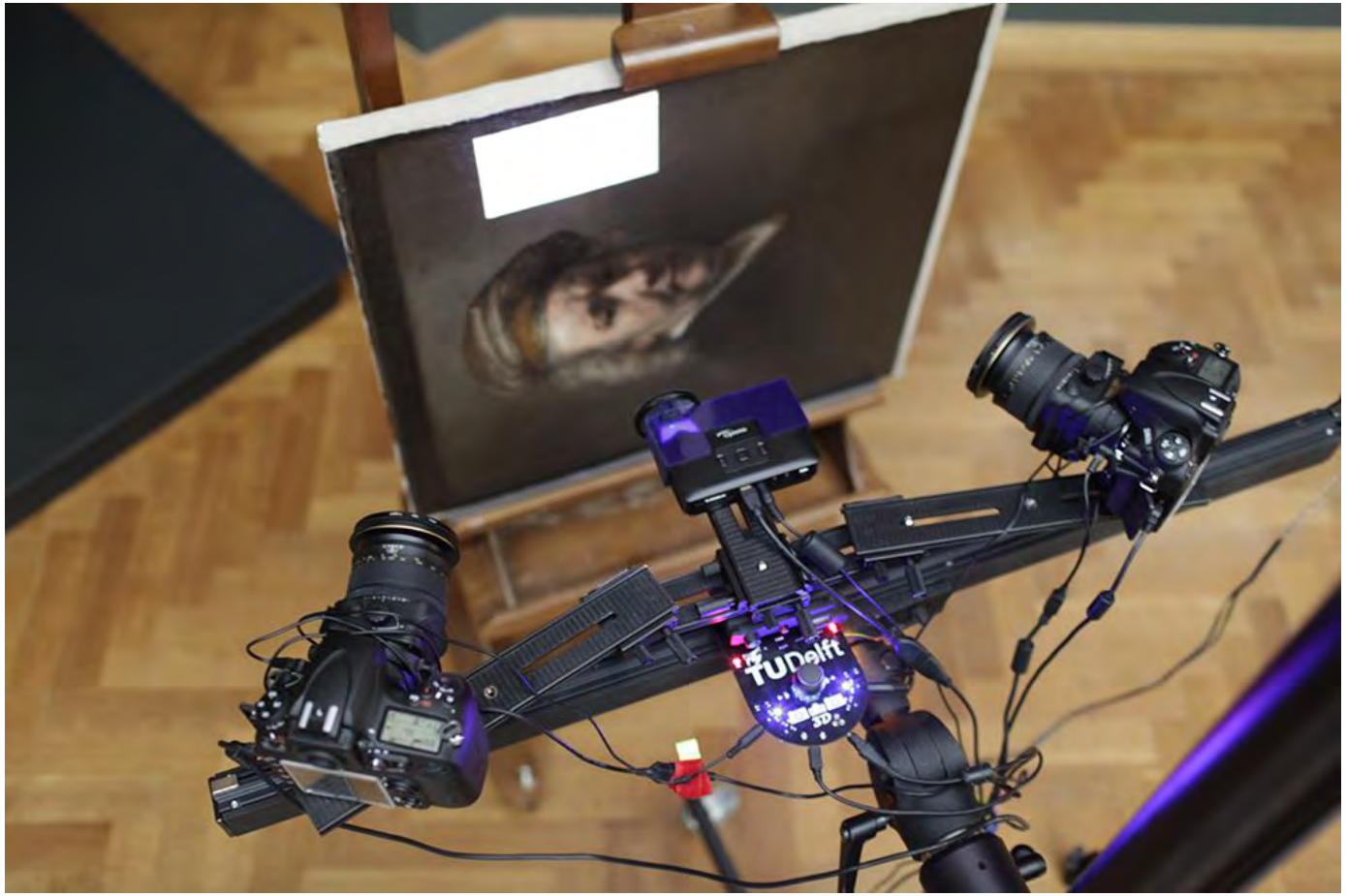
How to reproduce relief, brushstrokes, topography, and craquelure?

Applications: 3D fine art scanning

- 3D scanning
- Cooperation with Delft University of Technology: Materials in Art and Archaeology

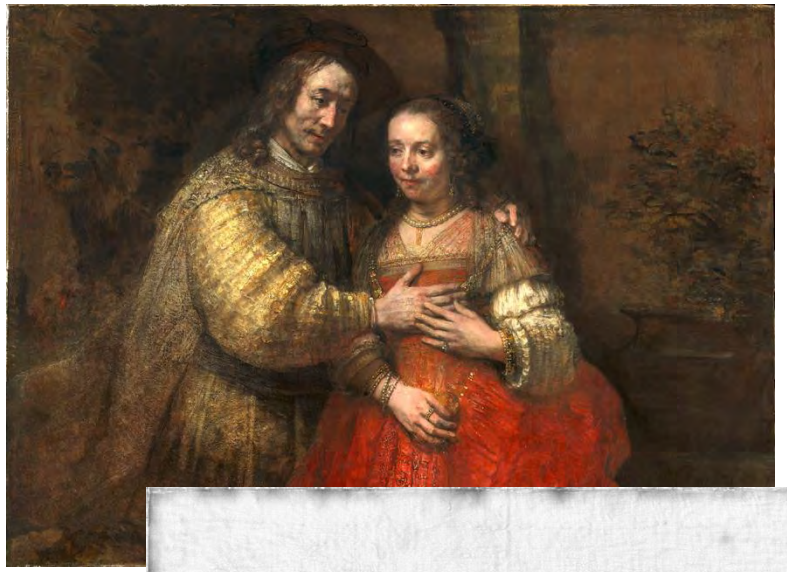
Source: http://www.timzaman.com/2013/09/3d-scan-and-print-paintings/

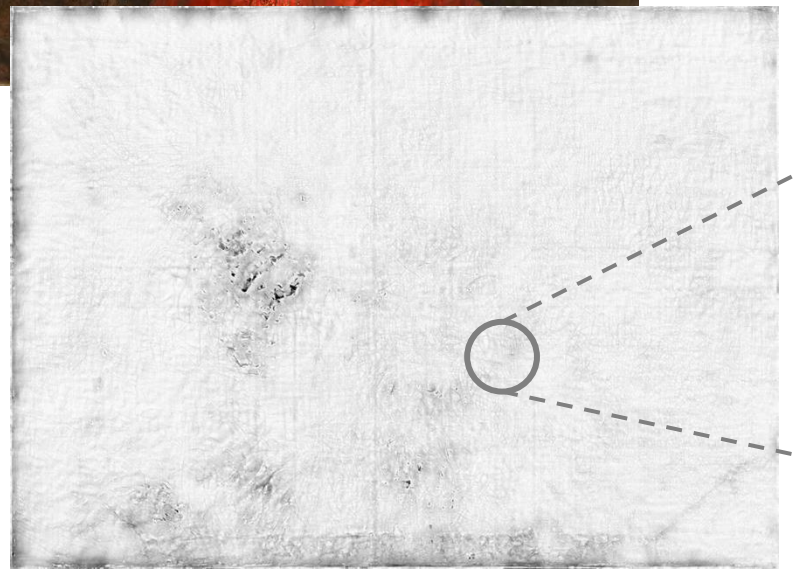
Applications: 3D fine art scanning

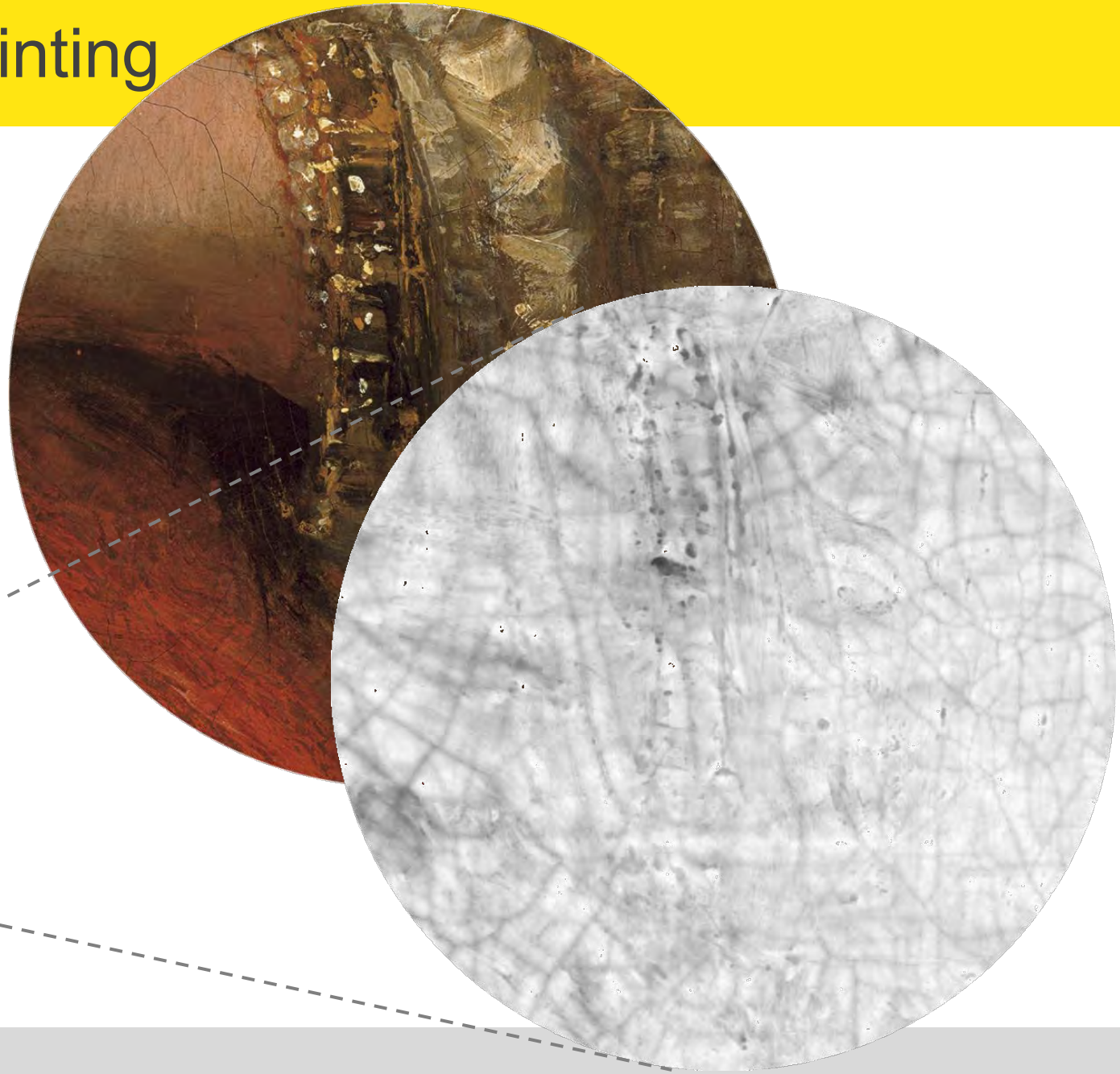


- Two DSLR cameras in stereo
- Projector projects fringe pattern
- Obtain color and depth image in one scan (to obtain a perfect alignment)
- Scanning in parts to obtain high resolution images
- Process and stitch the images

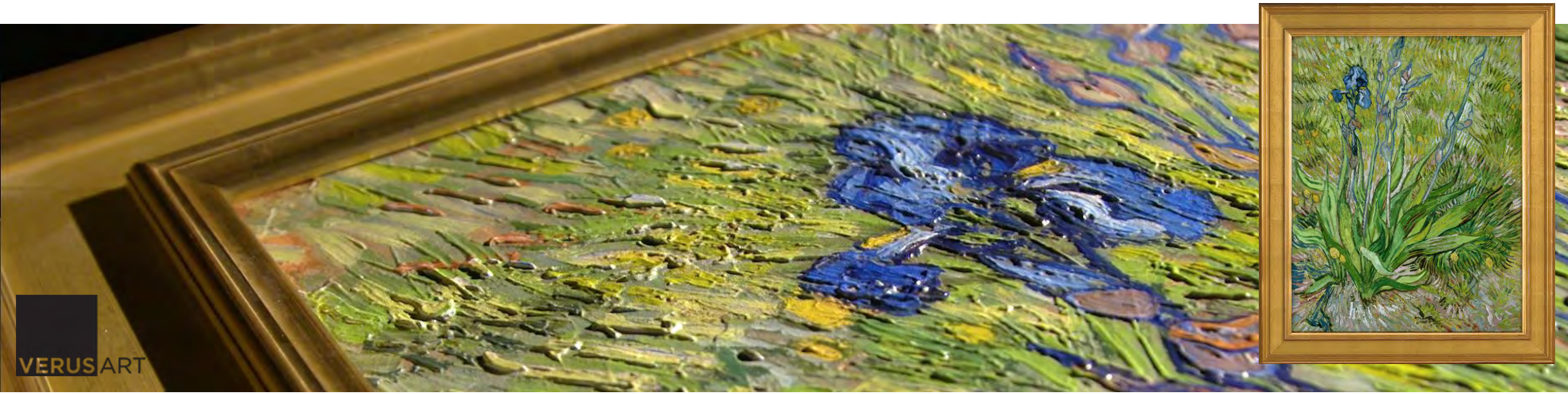
Applications: 3D fine art printing







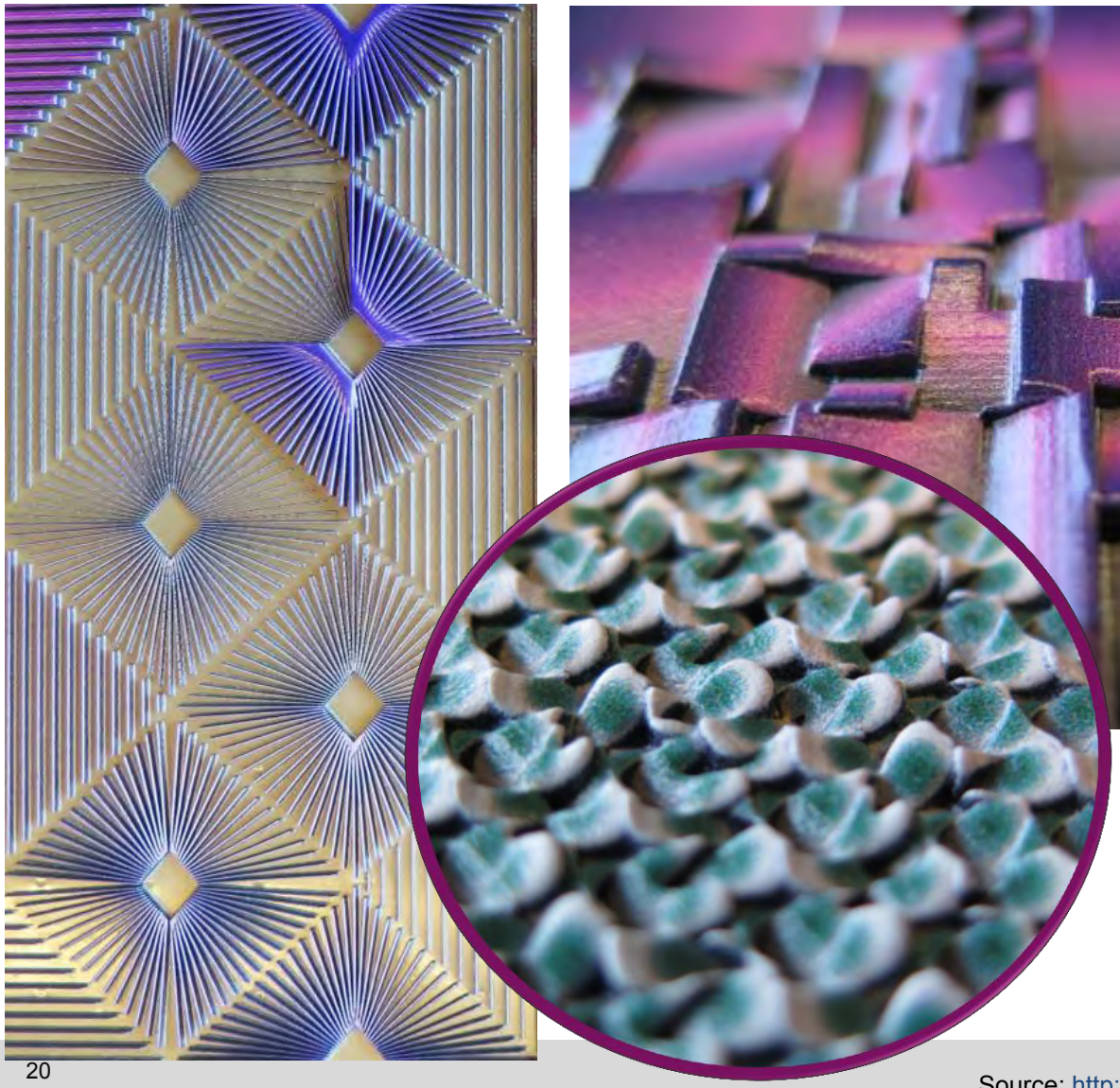
Other 3D fine art projects



- Mauritshuis The Hague: (Rembrandt, Vermeer, Rubens)
- National Gallery of Canada (Van Gogh, Monet)
- Guggenheim Venice (Jackson Pollock)
- …and many more

http://www.verusart.com

Applications: Interior decoration



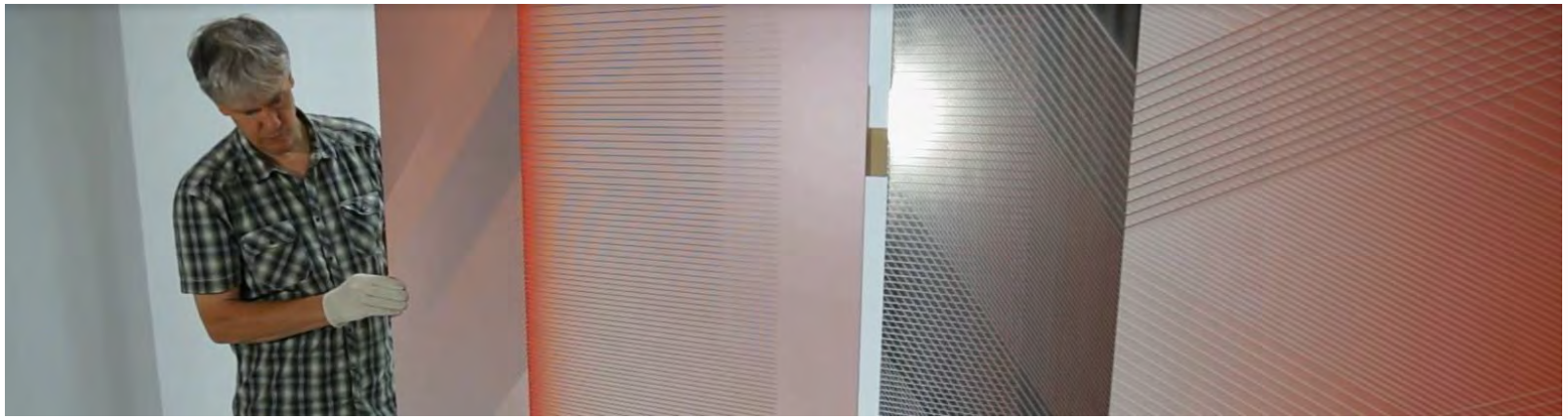
Super Maker

http://super-maker.tumblr.com/

DESIGN ACADEMY EINDHOVEN
DESIGN

Source: http://super-maker.tumbr.com, Photos by group Karianne Rygh, Research Associate and Freelance Designer

Applications: Interior decoration



- Unique designs
- Large size panels
- Full color, high resolution
- A little relief makes a huge difference

Take-away

- High resolution color 3D printing is at our doorstep.
- Already large amount of applications are being tested with real customers & businesses
  - Ink objects: business cards, smartphone cases …
  - Elevated maps for both decoration & visually impaired support.
  - Fine-art re-creation.
  - ...
- ICC was the cornerstone to achieve the first step in color consistency.
- iccMAX has all the functionalities to build in the next ones.

More information

Do you want to know more about the elevated printing technology of Project EIGER?
Visit www.projecteiger.com or let's talk via info@projecteiger.com